

What is claimed is:

1. An optical data storage medium, comprising:  
a plurality of recording layers, each of the recording layers being transparent to a light beam incident thereto and dispersed with a semiconductor material; and  
a number of spacers formed adjacent to the recording layers.
2. The optical data storage medium as recited in claim 1, wherein the semiconductor material in the recording layers is crystallized in the order of nanometer.
3. The optical data storage medium as recited in claim 1, wherein the recording layers are made of silica.
4. The optical data storage medium as recited in claim 3, wherein the semiconductor material includes Si or Ge.
5. The optical data storage medium as recited in claim 3, wherein the transparent thin layers are doped with Er or Eu.
6. An optical data storage device, comprising:  
a first laser generating means for generating a first laser beam;  
a first light generating means having a first condensing means placed in the lower part of the first laser generating means, for injecting the laser released from the first laser generating means to the optical data

40007252.7250

storage medium; and

an optical data medium supporting means placed in the lower part of the first light generating means.

7. The optical data storage device as recited in claim 6, further comprising:

a second laser generating means for generating a second laser beam; and

a second light generating means having a second condensing means placed in the upper part of the second laser generating means for injecting the laser released from the second laser generating means to the optical data storage medium and confronts the first light generating means with the optical data storage medium in between.

8. The optical data storage device as recited in claim 7, wherein the first light generating means further includes a first optical filter positioned in the lower part of the first condensing means; and the second light generating means further includes a second optical filter positioned in the upper part of the second condensing means.

9. The optical data storage device as recited in claim 6, wherein the first light generating means and the second light generating means are controlled by a first positioning means and a second positioning means which are connected to a data processing means.

10. An optical data recording and searching device, comprising:

a first laser generating means for generating a first laser beam;

a first condensing means placed in the lower part of the first laser generating means for injecting the laser released from the first laser generating means to the optical data storage medium;

an optical separating means placed between the first laser generating means and the condensing means, for separating the laser beam and the luminescence beam;

a first light generating and detecting means having a light detecting means for detecting the luminescence beam transmitted from the optical separating means; and

an optical data medium supporting means placed in the lower part of the first light generating and detecting means.

11. The optical data recording and searching device as recited in claim 10, further comprising:

a second laser generating means for generating a second laser beam;

a second light generating and detecting means having a second condensing means placed in the upper part of the second laser generating means for injecting the laser released from the second laser generating means and confronts the first light generating and detecting means with the optical data storage means in between.

12. The optical data recording and searching device as recited in claim 11, wherein the first light generating means further includes a first optical filter in the lower part of the first condensing means; and the second light generating means further includes a second optical filter in the upper part of the second condensing means.

13. The optical data recording and searching device

as recited in claim 10, wherein the first light generating means and the second light generating means are controlled by a first positioning means and a second positioning means respectively.

14. The optical data recording and searching device as recited in claim 13, further including a light intensity filtering means on the surface of the light detecting means.

15. A method for recording optical data based on an optical data storage device, wherein the optical data storage device includes a first laser generating means, a first light generating means and an optical data medium supporting means, the method comprising the steps of:

a) placing an optical data storage medium in which a plurality of transparent thin layers dispersed with semiconductor and transparent space layers are piled up alternately on the lower part of the first light generating means;

b) rotating the optical data storage medium and arraying focus of the beam released from the first light generating means on the data recording region; and

c) radiating the laser beam according to data binary code signals and crystallizing the data recording region by treating thermally.

16. The method as recited in claim 15, wherein in the step c), a laser beam with the pulse width of less than  $10^{-9}$  sec is radiated.

17. The method as recited in claim 16, wherein in the step c), the energy of the laser released from the first

laser generating means is higher than half the energy gap of the transparent thin layer.

18. The method as recited in claim 17, wherein a serial process of the step b) leading to step c) is performed at least once.

19. A method for recording optical data based on an optical data storage device, wherein the optical data storage device includes a first laser generating means, a first light generating means, a second laser generating means, a second light generating means and an optical data medium supporting means, the method comprising the steps of:

a) placing an optical data storage medium in which a plurality of transparent thin layers dispersed with semiconductor and transparent space layers are piled up alternately between the first light generating means and the second light generating means;

b) rotating the optical data storage medium and arraying the focus of each beam released from the first and second light generating means to be crossed on the data recording region; and

c) radiating laser beams from the first and second laser generating means according to data binary code signals and crystallizing the data recording region by treating thermally.

20. The method as recited in claim 19, wherein in the step c), each energy emitted from the first and second laser generating means is lower than the energy gap of the transparent thin layer, and the sum total of the energies of the two laser beams is higher than the energy gap of

DRAFT - FEB 2000

the transparent thin layer.

21. The method as recited in claim 20, wherein a serial process of the step b) leading to step c) is performed at least once.

22. A method for searching for optical data based on an optical data storage and detection device, wherein the optical data storage and detection device includes a first laser generating means, a first condensing means, an optical separating means, a first light generating and detecting means and an optical data medium supporting means, the method comprising the steps of:

a) placing an optical data storage medium in which a plurality of transparent thin layers dispersed with semiconductor and transparent space layers are piled up alternately in the lower part of the first light generating and detecting means;

b) rotating the optical data storage medium and arraying the focus of a beam released from the first laser generating means on a certain data searching region;

c) radiating a laser on the data searching region;  
and

d) detecting the luminescence obtained from the crystalline semiconductor with a light detecting means of the first light generating and detecting means.

23. The method as recited in claim 22, wherein the energy released from the first laser generating means is higher than half the energy gap of the crystalline semiconductor.

24. A method of optical data searching based on an

SEARCHED SERIALIZED

optical data storage and detection device, wherein the optical data storage and detection device includes a first laser generating means, a first condensing means, an optical separating means, a first light generating and detecting means, an optical data medium supporting means, a second laser generating means and a second light generating means, the method comprising the steps of:

- a) placing an optical data storage medium in which a plurality of transparent thin layers dispersed with semiconductor and transparent space layers are piled up alternately between the first light generating and detecting means and the second light generating and detecting means;
- b) rotating the optical data storage medium and arraying the focus of each beam released from the first and the second laser generating means to be crossed on a data searching region;
- c) radiating a laser from the first and second laser generating means on the searching region; and
- d) detecting the luminescence obtained from the crystalline semiconductor with a light detecting means of first light generating and detecting means.

25. The method as recited in claim 24, wherein in the step c), the sum total of energies of the two lasers released from the first and second laser generating means is higher than the energy gap of the crystalline semiconductor.

26. The method as recited in claim 25, wherein a serial process of the steps b) to d) is performed at least once.